

## **REMARKS**

### **I. Status of the Claims**

Elected Claims 1-11 are pending.

Claims 1-11 stand rejected.

Claim 2 has been amended. No new matter has been added.

### **II. Examiner's Objection to the Claims**

The Examiner has objected to claim 2 as allegedly containing informalities. More specifically, the Examiner suggests "[t]he term 'wells' in line 2 should read --well--."

Applicant wishes to thank the Examiner for his observation in the wording of claim 2 and has endeavored to amend claim 2 to correct the noted informality. Claim 2, as amended, shown here in amended form, now recites:

2. The semiconductor laser diode according to claim 1, further comprising a quantum [wells] well layer formed in the active layer.

Having amended the claim in accordance with the Examiner's suggestion, applicant submits that the Examiner's objection to the claim can no longer be sustained. Applicant respectfully requests reconsideration, withdrawal of the objection and allowance of the claim.

### **III. Rejection under 35 U.S.C. §102**

The Examiner has rejected claims 1-8 and 10-11 under 35 U.S.C. §102(e) as allegedly being anticipated by USP 5,960,020 issued to Nagai. It is the Examiner's position that Nagai discloses each and every element of the invention claimed.

Applicant respectfully disagrees with, and explicitly traverses, the Examiner's position.

A claim is anticipated only if each and every element recited therein is expressly or inherently described in a single prior art reference. As will be shown, Nagai does not expressly or inherently describe each and every element recited in independent claim 1.

Claim 1 recites:

1. A ridge waveguide semiconductor laser diode adapted to support desired lateral modes of generated light, comprising:  
a first conductor layer for application of a current;  
a second conductor layer facing the first conductor layer;  
an active layer disposed between the first and second conductor layer;  
a defined gain region of the active layer adapted for conducting the current;  
and  
**reduced conductivity regions** of the active layer, flanking the defined gain region, **adapted to impede passage of the current.** [emphasis added]

Hence, the present invention is a semiconductor laser that includes reduced conductivity regions within the active region that impede the flow of current therethrough.

Nagai, on the other hand, discloses a ridge semiconductor laser containing an active region that has a non-disordered region 3 contained within adjacent disordered regions 7. The disorder region 7 is formed to have an "effective band-gap energy [level] ... larger than the non-disordered active layer 3 and the effective refractive index of the disordered region 7 is smaller than that of the non-disordered active layer 3." (see column 7, lines 33-37).

Accordingly, the Nagai device contains an active region with a gain region having a high reflective index and adjacent second regions that have lower refractive indices. Furthermore, the adjacent disordered regions have higher band-gap levels that inhibit the generation of photons therein with the same current level in the non-disordered region. Hence, in the Nagai device photons generated in the gain region are optically contained in the gain region by the difference in reflective indices.

Accordingly, Nagai teaches a device that **optically** maintains photons generated within the gain region through a difference in reflective indices. Nagai does not teach impeding the progression of current outside the gain region as is claimed in the present invention.

Accordingly, Nagai cannot be said to anticipate the present invention because Nagai does not disclose each and every element of the present invention. Nagai does not teach the element of a "reduced conductivity regions ... adapted to impede passage of the current," as is disclosed in the present invention.

Accordingly, Claim 1 includes claimed subject matter not found in the reference cited and is therefore patentably distinguishable over the prior art. Applicant submits that the Examiner's rejection has been overcome and can no longer be sustained. Applicant respectfully requests that the rejection be withdrawn and Claim 1 be allowed.

With regard to claims 2-8 and 10-11, these claims ultimately depend from and include all the subject matter of independent claim 1, which has been shown to be patentably distinguishable over the prior art and allowable. Accordingly, claims 2-8 and 10-11 are also believed to be allowable based on their dependence from independent claim 1. Applicant respectfully requests withdrawal of the rejection and allowance of the claims.

Having shown that claims 1-8 and 10-11 disclose subject matter not disclosed in the cited reference, applicant submits that the reasons for the Examiner's rejection of the claims has been overcome. Applicant respectfully requests reconsideration, withdrawal of the rejection and allowance of the claims.

#### **IV. Rejection under 35 U.S.C. §103**

The Examiner rejected claim 9 under 35 U.S.C. §103(a) as allegedly being unpatentable over Nagai ('020) in view of USP 5,469,457 issued to Nagai. It is the Examiner's position that "Nagai '020 discloses all of the limitations of the claims ... but does not disclose the specific energy of the high energy implanted ions. Nagai '457 teaches a device where Si ions are implanted for the same reason as in Nagai '020, to produce disordered regions where little current flows. Nagai '457 teaches that these ions be implanted at an energy of 150 KeV. It would have been obvious to one skilled in the art to implant the atoms at that energy as the atoms will be sufficient for disordering the quantum wells, and so the upper cladding will not be converted to the same conductivity as the lower cladding, as taught by Nagai '457.

Applicant disagrees with, and explicitly traverses, the Examiner's reason for rejecting the claim. A claimed invention is prima facie obvious when three basic criteria are met. First, there must be some suggestion or motivation, either in the reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the teachings therein. Second, there must be a reasonable expectation of success. And, third, the prior art reference or combined references must teach or suggest all the claim limitations.

As discussed previously, Nagai '020 teaches a device that optically maintains photons generated in a gain region within the gain region. Contrary to the Examiner's position, Nagai '020 does not disclose or suggest creating regions of low conductivity that limit current therethrough.

Nagai '457 discloses a ridge laser having a blocking layer position over the disordered regions to prevent current from entering the disordered region. Accordingly, Nagai '457 does not disclose or suggest creating regions of low conductivity that limit current therethrough. Rather, Nagai '457 discloses a separate current blocking layer that prevents current from entering the disordered region.

Having shown that neither Nagai reference, individually or in combination, provides the motivation for one skilled in the art to develop low conductivity regions as claimed, applicant submits that the reason for the Examiner's rejection of claim 9 has been overcome and can no longer be sustained. Accordingly, the present invention would not be rendered obvious in view of the cited references. Applicant, therefore, respectfully requests that the rejection be withdrawn and Claim 9 be allowed.

**V. Summary**

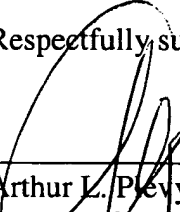
Applicant believes that all the Examiner's objections and rejections under 35 U.S.C. §§ 102, 103 have been addressed and overcome. Reconsideration, withdrawal of the objections and rejections and allowance of the claims is respectfully requested.

If the Examiner believes the prosecution of this application would be advanced by a telephone call, the Examiner is invited to contact the applicant's attorney at the telephone number indicated below.

**VI. Fees**

No fees are believed required for the filing of this Amendment and Response. However, if there are any fees due and owing because of this Amendment and Response, or for other matters regarding this application, the Examiner is authorized to charge such fees to Duane Morris, LLP., Deposit Account No. 50-2061.

Respectfully submitted,

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**VERSION WITH MARKINGS TO CLEARLY SHOW AMENDMENTS MADE**

**IN THE CLAIMS:**

Kindly amend claim 2 as follows:

2. (Amended) The semiconductor laser diode according to claim 1, further comprising a quantum [wells] well layer formed in the active layer.